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IS 6089-2 (1985): Sensitive Switches, Part 2: SPDT
Unsealed, Type 1 [LITD 3: Electromechanical Components and
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Indian Standard

SPECIFICATION FOR
SENSITIVE SWITCHES

PART 2 SPDT UNSEALED, TYPE 1

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INDIAN STANDARDS INSTITUTION

**MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002**

Indian Standard

SPECIFICATION FOR SENSITIVE SWITCHES

PART 2 SPDT UNSEALED, TYPE 1

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IS : 6089 (Part 2) - 1985

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Indian Standard

SPECIFICATION FOR SENSITIVE SWITCHES

PART 2 SPDT UNSEALED, TYPE 1

0. FOREWORD

0.1 This Indian Standard (Part 2) was adopted by the Indian Standards Institution on 24 May 1985, after the draft finalized by the Electromechanical Components for Electronic Equipment Sectional Committee had been approved by the Electronics and Telecommunication Division Council.

0.2 This standard (Part 2) covers requirements of sensitive switches, SPDT Unsealed, Type 1. The general requirements for sensitive switches are covered in IS : 6089 (Part 1)-1971*.

0.3 While preparing this standard assistance has been derived from the following specification:

JSS 51204(1971) Detail specification for switches, sensitive, Ministry of Defence.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960†. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard (Part 2) covers requirements of sensitive switches, SPDT Unsealed, Type 1.

2. TERMINOLOGY

2.1 For the purpose of this standard the definitions given in 2 of IS : 6089 (Part 1)-1971* shall apply.

*Specification for sensitive switches : Part 1 General requirements and tests.

†Rules for rounding off numerical values (revised).

3. CATEGORIES

3.1 Category 3 of IS : 6089 (Part 1)-1971* shall apply.

4. MATERIALS AND WORKMANSHIP

4.1 Provisions of 4 of IS : 6089 (Part 1)-1971* shall apply.

5. ELECTRICAL RATINGS

5.1 The ratings shall be chosen from the following:

Ratings	Current rating at atmospheric pressure						Current rating at low air pressure			
	Resistive		Inductive		Lamp		Resistive		Inductive	Lamp
	28 V dc	230V ac	28V dc	230V ac	28V dc	230V ac	28 V dc	230V ac	28 V dc	28 V dc
Set 2	5 A	2.5 A	3A	2.5A	2.4A	1 A	5 A	—	2.5 A	2.4 A
Set 3	2.5 A	5 A	0.25A	—	—	—	1 A	2 A	—	—
Set 4	2 A	2 A	0.12A	—	—	—	—	—	—	—

6. MARKING

6.1 Provisions of 6 of IS : 6089 (Part 1)-1971* shall apply.

7. TESTS

7.0 For test details, the relevant test clauses of IS : 6089 (Part 1)-1971* shall be referred.

7.1 **Classification of Tests** — Provisions of 7.1 of IS : 6089 (Part 1)-1971* shall apply.

7.2 **General Conditions of Tests** — Provisions of 7.2 of IS : 6089 (Part 1)-1971* shall apply.

7.3 Electrical Tests

7.3.1 *Electrical Operation* — The switch shall be connected to a circuit with suitable indicating devices and subjected to three cycles of operation.

The normally open contacts shall close and the normally close contacts shall open when the actuator is acted upon by the specified operating force.

The switch shall regain its initial condition on removal of the actuating force.

*Specification for sensitive switches : Part 1 General requirements and tests.

There shall be no intermittent opening or closing of contacts.

7.3.2 Contact Resistance — The contact resistance shall not exceed 10 milliohm when measured at a test voltage not exceeding 6 ± 1 V and the current not exceeding 100 mA.

Number of test activations — Three

7.3.3 Variation of Contact Resistance — The variation of contact resistance shall be measured during the vibration test.

7.3.4 Insulation Resistance — Insulation resistance measured with a dc voltage of 500 ± 50 V shall be not less than 1 000 megohms.

7.3.5 Voltage Proof

7.3.5.1 Switches shall withstand without breakdown or flash-over a voltage of 1 000 V rms for one minute applied between open terminals. At lower pressure the test voltage shall be 400 V rms.

7.3.5.2 Switches shall withstand without breakdown or flash-over a voltage of 500 V for 28 V and 2 kV for switches of higher ratings for one minute applied between all the terminals connected together and a metal plate on which the switch is mounted by normal means as specified in 7.2.5 of IS : 6089 (Part 1)-1971*.

7.3.6 Current Rating — Provisions of 7.3.6 of IS : 6089 (Part 1)-1971* shall apply

7.3.7 Overload — The requirements are given below:

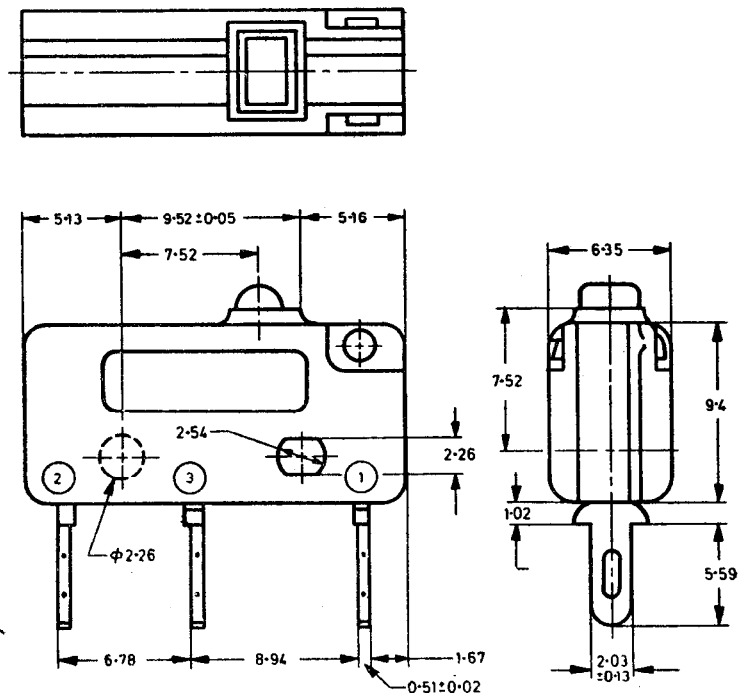
- a) Operating characteristics — No deterioration in the characteristics as given in 7.4.3;
- b) Contact resistance — 40 milliohms, *Max*;
- c) Voltage proof — No breakdown or flashover;
- d) Sealing — Not applicable;
- e) Insulation resistance — Insulation resistance measured with a dc voltage 500 ± 50 V shall be not less than 1 000 megohms; and
- f) Internal examination — There shall be no deformation.

7.4 Mechanical Tests

7.4.1 Provisions of 7.4.1 of IS : 6089 (Part 1)-1971* shall apply.

7.4.2 Dimensions and Weight — The dimensions shall be in accordance with Fig. 1 and the weight shall not exceed 2.7 g.

* Specification for sensitive switches : Part 1 General requirements and tests.



All dimensions in millimetres.

Tolerance ± 0.13 unless otherwise specified

FIG. 1 OUTLINE DRAWING AND DIMENSIONS

7.4.3 Operating Characteristics — The values are given below:

- | | | |
|-----------------------------------|---|---------------------|
| a) Actuating force | : | 1.42 N, <i>Max</i> |
| b) Release force | : | 0.28 N, <i>Min</i> |
| c) Overtravel force | : | 1.50 N, <i>Max</i> |
| d) Force differential | : | 0.05 N, <i>Min</i> |
| e) Pretravel distance | : | 0.75 mm, <i>Max</i> |
| f) Overtravel distance | : | 0.13 mm, <i>Min</i> |
| g) Release travel distance | : | 0.3 mm, <i>Min</i> |
| h) Movement differential distance | : | 0.1 mm, <i>Max</i> |

7.4.4 Soldering — The details are given in below:

- a) Test method : Solder bath test (Method 1), and
b) Period of recovery : 30 min

7.4.5 Robustness of Termination

7.4.5.1 Tensile test — The loading weight shall be 20 N for turret terminals and 89 N for solder lug terminals.

7.4.5.2 Bend test — The loading weight shall be 10.0 N.

7.4.5.3 Torsion test — Not applicable.

7.4.6 Vibration

- | | | |
|----------------------|-------------------------------------|---------------------------------|
| a) Severity of test: | Sweep range (c/s) | 10 to 500 |
| | Displacement
(peak-to-peak) or | 0.75 mm or 100 m/s ² |
| | Acceleration | |
| | Duration | 10 h |

- c) *Final measurement* — The switch shall be visually examined and tested for operating characteristics according to 7.4.1 and 7.4.3.

7.4.7 Bump—The switch shall be subjected to 2 000 bumps in the direction along the axis of the actuator and 1 000 bumps each along the remaining two axes.

7.4.8 Acceleration — The test shall be conducted at the severity of 170 m/s^2 .

After the test the switch shall meet the requirement of 7.4.1 and 7.4.3.

7.4.9 Shock — The switch shall be subjected to shock test at a severity of 500 m/s^2 and duration of pulse 1 ms. The switch shall be mounted in the most unfavourable direction.

After the test, the switch shall meet the requirements of **7.4.1** and **7.4.3**.

7.5 Transit Time Test — The requirements are given below:

- | | |
|--------------------|--------------------------------------|
| a) Test method | Method B, IS : 6089 (Part 1)-1971* |
| b) Operating force | 1.42 N |
| c) Release force | 0.28 N |
| d) Transit time | 50 ms, <i>Max</i> |

7.6 Short Circuit Test — The contact resistance shall not exceed 10 milliohms after the short circuit test.

***Specification for sensitive switches : Part 1 General requirements and tests.**

7.7 Climatic Tests

7.7.0 General — Provisions of **7.7.0** of IS : 6089 (Part 1)-1971* shall apply.

7.7.1 Climatic Sequence

7.7.1.1 Dry heat — The test shall be carried out at the temperature specified in **3.1** according to the category of the switch. The insulation resistance shall not be less than 1 000 megohms.

7.7.1.2 Damp heat (cyclic) (first cycle) — Provisions of **7.7.1.2** of IS : 6089 (Part 1)-1971* shall apply.

7.7.1.3 Cold — Provisions of **7.7.1.3** of IS : 6089 (Part 1)-1971* shall apply.

7.7.1.4 Low air pressure — Provisions of **7.7.1.4** of IS : 6089 (Part 1)-1971* shall apply.

7.7.1.5 Damp heat (cyclic) (remaining cycles) — Provisions of **7.7.1.5** of IS : 6089 (Part 1)-1971* shall apply.

7.7.1.6 Final measurements — The requirements are given below:

- a) General examination — See **7.4.1**.
- b) Working test — See **7.7.1.6** (b) of IS : 6089 (Part 1)-1971*.
- c) Insulation resistance — Insulation resistance measured in accordance with **7.3.4** shall not be less than 100 megohms.
- d) Voltage proof — See **7.3.5**.
- e) Contact resistance — Contact resistance measured in accordance with **7.3.2** shall not be more than 40 milliohms.
- f) Sealing — Not applicable.
- g) Operating characteristics — See **7.4.3**.

7.7.2 Damp Heat (Steady State)

7.7.2.1 Final measurements — As specified in **7.7.1.6**.

7.7.3 Rapid Change of Temperature

7.7.3.1 Final measurements — As specified in **7.7.1.6**.

7.8 Sealing — Not applicable.

7.9 Mould Growth — Provisions of **7.9** of IS : 6089 (Part 1)-1971* shall apply.

7.10 Salt Test

7.10.1 Final Measurements — As specified in **7.7.1.6**.

7.11 Dust — Not applicable.

7.12 Endurance — The number of operations shall be 25 000.

7.12.1 Final Measurements — As specified in **7.7.1.6**

*Specification for sensitive switches : Part 1 General requirements and tests.



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